TASHIH TRIBE GATSEN AGAINST GREENHOUSE MACHINE PROJECT

計劃起源 / Origin of the project

扎格森職業學校（*Tashi Getsan Charity Vocational school*）成立於*2009*年，由倉薩貢噶仁波切成立，每年歡迎*25*至*45*名學生，年齡從*4*歲到*14*歲。他們的任務是提供實質性教育，為來自貧困環境的孩子提供健康的食物和住所，從而使他們有機會獲得教育並茁壯成長，直到中學。

溫室項目紮根於藝術家施惟捷和環境工程師*Wiriya Rattanasuwan*的慈善活動，*2018*年*11*月他們與*Tashi Getsen*慈善學校和*Nangqen*的當地居民建立了第一個溫室建築原型，期待為被學校庇護的孤兒們提供全年食物。在溫度降至*-30°C*的冬季中要餵養所有學生是極度困難的。由藝術家和研究人員構思和建造的溫室必須要抵禦寒冷的天氣，並且全年都能保持高效。因此，該項目的首要挑戰之一是建立一個可操作的溫室，以生產適量的食物和良好的營養品質。從這個根源，我們希望發展不同的分支：科學研究實驗室和藝術項目，並且期待透過這些分支回頭來支援溫室的建造計劃。由於各種科技在計劃中的參與，溫室因此成為一個跨域的實驗場所。其中一個主要實驗是將物聯網傳感器集成到溫室結構中，因此我們希望能夠收集特定於高海拔環境的天氣和環境數據，這些數據將在公共互聯網平台上傳播，創建第一個鏈接不同領域的研究人員之間的開放社群網絡。

來自創作背景的藝術家為這個項目提供藝術方面也很重要。施惟捷的實踐與技術研究有關，特別是智能紡織創新。他創辦了*Tribe Against Machine*工作室，邀請國際設計和紡織研究人員與台灣泰雅族的代表合作。通過這次研討會，他在先進技術和傳統做法（如編織和紡織染色）之間架起了一座橋樑，因此在當前背景下審視傳統文化習俗的地點和未來，優先考慮技術進步的全球化。

所有這些活動相互聯繫，並在溫室環境中融合，儘管我們的第二個挑戰是引導那些遭遇，以便一個人不會克服其他人，所有人都有空間呼吸和茁壯成長。

受到*Anna Lowenhaupt Tsing*和她的書“世界盡頭的蘑菇”的啟發，這個溫室是生長和實驗生態的基礎*;*人類，生物和技術。使用安娜青的話，我們的目標是創造一個“複調組合”的“世界製造項目，人類而不是人類”。正如作者所解釋的那樣，我們周圍已經有各種世界製造項目，影響著我們的環境，但在人類世時代，人類活動使所有其他生物體都黯然失色。通過注意這些其他活動並與之合作甚至鼓勵它們，我們可以創造一個有效的生態學，人類和非人類的主體可以共同生活，我們建議替代以人為本的工作，危及我們的星球和我們自己的星球。生活在今天。

通過專注於有限和精確環境（*Tashi Getsen*學校）的慈善活動，溫室實際上在全球範圍內實現了增長，其中包括對其提供的數據感興趣的科學家網絡以及我們希望通過合作開發的藝術家和文化組織網絡為其帶來更多的可視性。
可見性確實是我們的最後一項挑戰。
*Nangqen*是西藏的一個偏遠地區，由於溫室開發的藝術和科學網絡，它將在世界範圍內成長。通過古典藝術市場或科學撥款系統之外的溝通渠道，這種擴展將通過一個項目來實現，這個項目將當地人口的教育和利益定位於前端，並擴展到可用於研究和創造的可訪問信息，可在外部獲得學術機構，對任何想要使用溫室數據的人。我們正在探索基於共享，空間和資源經濟的慈善事業的可能性，在這種經濟中，各種生命形式可以生存和發展。

The Greenhouse project takes root in a charity initiative by the artist Shih Wei Chieh and the scientist Wiriya Rattanasuwan, who engaged with the Tashi Getsen Charity School founded by Tsangsar Kunga Renpoche and the local population of Nangqen the building of a greenhouse to provide food year-round for the orphan children sheltered by the school.
The difficulty to feed all the students is particularly present in the winter time when temperatures can go down to -30°C. The greenhouse that will be conceived and built by the artist and the researcher is destined to resist cold weather and be efficient all year long.
Thus, one of the first challenges of this project is to build an operative greenhouse to produce food in proper quantities and with good nutritive quality.

From this root, we wish to grow different branches: a scientific research laboratory and an artistic program.
The greenhouse thus turns into a ground for experimentation in different disciplines thanks to the implementation of various technology.
One of the main experiment is to integrate IOT sensors in the greenhouse structure, thus we hope to be able to collect weather and environmental data specific to a high altitude context, that will be communicated on a public internet platform, creating the first links of an open network between researchers of different fields.
Coming from a creative background, it also felt important to the artist to give an artistic aspect to this project. Shih Wei Chieh's practice is linked to technological research, especially smart textile innovation. He founded the Tribe Against Machine workshop, inviting international design and textile researchers to work with representatives of the Atayal tribe of Taiwan. Through this workshop, he creates a bridge between advanced technology and traditional practices, such as weaving and textile dyeing, therefore interrogating the place and future of traditional cultural practices in a present context that prioritizes the globalization of technological advances.

All these activities link with each other and merge in the context that is the greenhouse, though our second challenge is to guide those encounters so one doesn't overcome the others and all have space to breathe and thrive.
Inspired by Anna Lowenhaupt Tsing and her book « The Mushroom at the End of the World », the greenhouse is ground for an ecology of growth and experimentation; human, biological and technological. To use the words of Anna Tsing, we aim to create a « polyphonic assemblage » of « world-making projects, human and not human ». As the author explains, there are already various world-making projects around us, affecting our environment, though, in the age of the Anthropocene, human activity overshadowed all the other organisms. By noticing these other activities and working along with them or even encouraging them, we can create a functioning ecology where human and non-human subjects can live together and we suggest an alternative to the human-focused work that endangers our planet and our very own lives today.

Growing from a charity initiative focused on a limited and precise context (the Tashi Getsen School), the greenhouse virtually grows globally with a network of scientists interested in the data it provides and a network of artists and cultural organizations that we hope to develop through collaborations to bring more visibility to it.
Visibility is indeed our last challenge.
Nangqen is a remote area in Tibet, which will see its presence in the world grow thanks to the artistic and scientific networks developed from the greenhouse. Through communication channels outside of the classical art market or scientific grant system, this expansion will happen thanks to a project that positions the education and benefit of the local population at the front and extends towards a sharing of accessible information for research and creation, available outside of academic institutions, to whoever wishes to use the greenhouse's data. We are exploring the possibility of charity based on an economy of sharing, space and resources, in which various life forms can survive and thrive.

青海溫室計劃主體 / Project Context

城市地區的一個巨大挑戰是如何在生產工廠污染的環境，道路或空中交通等通信方式中保持人口健康，以及大型人類活動集中的大都市排放的日常污染。此外，如何為越來越多的人離開農村地區提供人口重要資源（優質食品，清潔空氣，休閒時間和地區......），從而將農村活動視為農業。
不同城市的解決方案不同；在巴西聖保羅，（*Centro Cultural Sao Paulo*）人民在屋頂種植花園，法國建築機構*Studio NAB*提出了一個雄心勃勃的垂直超級農場項目，以解決城市人口增長問題，以及胡志明市的呼吸屋，由*Vo Trong Nghia Architects*使用植物的面紗來調節其內部微氣候。
來自全球不同地區的解決方案正在探索中，這個全球化的運動討論的是植物的使用和城市地區的農業實施。這種興趣表明需要確保高質量的生活資源，並為此找到我們當前生活方式和生產方式的替代方案。

受到溫室的啟發，從囊謙當地社區的一項慈善活動開始，我們相信這個跨領域項目可以激發都市生活的創新，比如台北市。結合一個實際的溫室計劃，科學研究實驗室組織和藝術項目等，所有這些都有各自的目標和利益，創造出一種後人類中心生態（*post-anthropocentric ecology*）。
通過確保不同生物和非生物群體（人類，植物，動物，數字......）之間的互助和和諧共存，我們希望可以發現一種兼顧我們社會結構及其各種行為者之間關係的替代方式。

這個結合社會計劃和當代藝術的複合式溫室計劃是一種探索不同生命形式的同居方式，幫助彼此在後工業世界中生存，從改變思維方式開始。

HOW TO?
我們希望將這個項目從西藏囊謙的高海拔地區帶到人口稠密的台灣台北，這是第一種方式，就是在溫室收集環境和植物數據製作的人工智能電影。

人工智能意識將從植物活動中產生敘事，因此「人工」在關於成長，生活和共享環境的意外敘事中與「自然」相遇。

在該計劃的建設過程中建立了不同的聯繫；傳統的農業技術符合人工智能的現代創新技術，兩種思想，通常是對抗和共生，然後將與人類思想共享。此外，兩個地理位置分離的區域相互靠近，囊謙和台北，不需要依靠商業需求。也許這是一種超越邊界的共享意識的可能性，通過其每個生物，人類和植物的意識來豐富。

A great challenge in urban areas is how to keep the population healthy in an environment polluted by production factories, communication ways, such as roads or air traffic, but also the daily pollution emitted by big metropolises where a large human activity concentrates.
Furthermore, how to provide its population vital resources (quality food, clean air, leisure time and areas…) while more and more people are leaving rural regions and thus, rural activities, as agriculture.

Different cities have different solutions ; Sao Paulo grows gardens on its high rooftops (Centro Cultural Sao Paulo), the French architecture agency Studio NAB presented an ambitious project of vertical Superfarm to deal with the issue of urban population growth, and a Breathing House in Ho Chi Minh City, designed by Vo Trong Nghia Architects, uses a veil of plants to regulate its interior microclimate.

From different areas across the globe, solutions are being explored, and what arises from this global movement is the use of plants and the implementation of farming in urban areas. This interest shows a need to secure quality life resources and, in order to that, find alternatives to our current lifestyle and ways of production.

Inspired by the Greenhouse, started as a charity initiative in the local community of Nangqen, we believe this multidisciplinary project can inspire innovating alternatives for life in an urban context, such as Taipei.

Combining an operative greenhouse, a scientific research lab and an artistic program, all with their own respective goals and interests, the creation of a post-anthropocentric ecology is made possible.

By ensuring mutual aid and harmonious coexistence between different biological and non-biological groups (human, vegetal, animal, digital…) we may discover an alternative way of considering the structure of our society and the relationships between its various actors.
The Greenhouse project is a way to explore the cohabitation of different life forms, helping each other to survive in a post-industrial world, that begins with a change of mindset.

HOW TO?
The first way we would like to bring this project from the high altitude of Nangqen, Tibet, to densely populated Taipei, Taiwan, is with the presentation of an AI-generated movie, made from environmental and plant data collected in the Greenhouse. The AI consciousness will generate a narrative from the plant activity, thus the « artificial » meets the « natural » in an unexpected narrative about growth, life, and a shared environment.
Different connections are established during the building of this project; the traditional technology of farming meets the modern and innovative technology of the artificial intelligence, two minds, usually antagonized, meet and cohabit in an artwork which will be shared with human minds afterward. Furthermore, two geographically separated areas are brought closer to each other, Nangqen and Taipei, without the need of that bond resting on commercial needs. Perhaps it is the possibility of a shared consciousness that goes beyond borders, enriched by the consciousness of each of its living beings, humans, and plants.

一部由植物和人類共同創作的電影－非人類中心的溝通網絡

計劃中將透過探討如何製造一種「不受人類政治糾纏」，「去人類中心化」和「生成劇本」的紀錄片形式，這個技術取材於一個科幻概念：「人的意識是和植物意識一起成長的*(co-evolved)*」，創造一個植物和人共同編纂的影像作品。技術面上，本計劃期望利用*GANs*（*Genrative Adversarial Networks* - 生成對抗人工智慧）、*NLP*（*Neuron Language Programming* - 神經語言規劃）來設計一個「植物和人共同創作的」線上生成視頻。初期設置：在青海和台北的溫室中將置有攝影機和植物，每一株植物的生長將被攝相機轉化成具體的數位數據。植物的視頻將被上傳到雲端並能在網頁中瀏覽，民眾可以藉由給與少量金額去「認養」這些配有帳號的植物，或是上傳手機視頻到特定植物帳號來得到反饋。手機上傳影片、金額、每一株植物的瀏覽量、溫室裡人和植物的互動影像以及兩地的天氣數位實時資料將被提供給雲端演算法，成為生成影片的生成語意基礎，還有為影格排序提供規則，藉以產生影片，成為溫室心智的代言人。這些影片將被生成並被定期放上雲端，為溫室內生態圈的成長提供視覺化，讓相隔兩地的溫室透過抽像的藝術進行「對話」，讓兩個社會得以透過和植物的互動，創造某種程度上的社會連結。最後這些和植物互動的產生出來的影片將被依時序安排在網頁上做最後的展出。

生成影像主軸圍繞「後資本社會、心智是什麼、未來世界形繪」的資料庫和智能。這個討論將由文字、圖片、動畫、偽紀錄片等元素組成。將以搜尋關鍵字的方式在*Youtube*上收集生成影片素材，另外溫室中的攝影機也能夠提供溫室周圍的視頻，這些關鍵字和搜尋範圍將成為生成影片語意上成功的關鍵。

思辨藝術計劃和社區當地需求的共地關係

這個模型計劃可能從最初的和社區的合作夥伴關係最終演化為和社區合為一體。社區和藝術計劃的同質化將可能導致社區成為藝術計劃素材的一部份。這也是另一種共享經濟在藝術領域中的表現。

邀請國際生物藝術團體共同參與製作

植物是否具有主觀意識以及其對週遭環境變化有感應已經在過去五十年不斷有各式文獻記載。另外一種說法是人類的意識是和植物共同演化的，而人類意識在植物心靈控制之下得到了主觀性和自我性，以為人類是獨立於自然界的主宰，這種虛幻的自我中心使人類實際上只不過是成為植物的清道夫和管理者。本計劃除了溫室心智影片的創造之外，亦將邀請*Allien in Green*, *Hackteria*等團體，*Marc Duseller, Špela Petrič*等藝術家一同在此框架下以十天工作坊方式共同創作。邀請技術將圍繞在分子科技的程度上植物如何進行溝通，以及透過工作坊的方式邀請民眾參加，藉以推廣溫室興建的議題。

A Film Created By Plant And Humans
The plan will explore how to create a documentary form that is "not entangled in human politics," "going to human centralization" and "generating scripts." This technique is based on a science fiction concept: "Human consciousness grows with plant consciousness. (co-evolution) "Create a video work co-edited by plants and people. On the technical side, the program expects to use GAN (Genrative Adversarial Networks - Generating Against Artificial Intelligence), NLP (Numeric Language Programming - Neuro-Language Planning) to design a "plant-to-people co-authored" online generated video. Initial setup: There will be cameras and one plants in the greenhouses of Qinghai and Taipei, and the growth of each plant will be converted into specific digital data by the camera. The plant's video will be uploaded to the cloud and can be viewed on the web. People can get feedback by giving a small amount of money to "adopt" these plant-based plants, or uploading a mobile video to a specific plant account. The mobile phone uploads the video, the amount, the pageview of each plant, the interactive images of people and plants in the greenhouse, and the real-time data of the weather digital data of the two places will be provided to the cloud algorithm, which becomes the basis of the generated language of the generated film, and also for the frame. Sorting provides rules to generate a film and become a spokesperson for the greenhouse mind. These films will be generated and regularly put on the cloud to visualize the growth of the ecosystem within the greenhouse, allowing the greenhouses in the two places to "talk" through the art of abstraction, allowing the two societies to interact with the plants. Create a certain degree of social connection. Finally, the resulting films that interact with the plants will be scheduled to be displayed on the web page for final presentation.

Generate a database of the main axis of the "post-capital society, what is the mind, the future of the world" database and intelligence. This discussion will consist of elements such as text, images, animations, and pseudo-documentaries. The video will be collected on the Youtube by searching for keywords, and the cameras in the greenhouse will also be able to provide videos around the greenhouse. These keywords and search scope will be the key to the success of the film.

The model relationship between the speculative art program and the local needs of the community may evolve from an initial partnership with the community to a community. The homogenization of community and art programs will likely lead the community to be part of the art program. This is another manifestation of the sharing economy in the art field.

Invite international bio-art groups to participate in the production
Whether plants have subjective consciousness and their sense of environmental changes has been documented in the past 50 years. Another way of saying is that human consciousness is co-evolving with plants, and human consciousness is subjective and self-contained under the control of plant minds, thinking that human beings are independent of nature. This illusory self-center makes human beings actually It is just a scavenger and manager who becomes a plant. In addition to the creation of the greenhouse mental film, the project will also invite Allien in Green, Hackteria and other groups, Marc Duseller, Špela to accompany the same artists to create together in the framework of a 10-day workshop. The invitation technology will focus on how the plants communicate in the degree of molecular technology, and invite people to participate in the workshops to promote the construction of greenhouses.

擴展思維 The Extended Mind

*Andy Clark*和*David Chalmers*（*1998*）的「擴展思維」是擴展認知領域的一項開創性著作。在本文中，*Clark*和*Chalmers*提出了主動外在主義（類似於語義或「內容」外在主義）的概念，提出現實環境中的物件作用為內在心靈的一部分。他們爭辯說，以頭骨作為邊界，只有頭骨內部才能包含心靈。心靈，身體和環境之間的分離被視為一種無原則的區分。因為外部物體在幫助認知過程中起著重要作用，所以思維和環境充當「耦合系統」。這種耦合系統可以被視為一種完整的認知系統。頭腦延伸到外部世界。*Clark*和*Chalmers*列出的在認知任務中將外部對象的使用作為擴展認知系統的一部分進行分類的主要標準是外部對象必須具有與內部過程相同的目的。

在"擴展思維"中，提出了一個思想實驗，以進一步說明環境在與思維相關的作用。奧托和英加的虛構人物同時前往博物館。奧托患有阿爾茨海默病，並寫下了他所有的指示，英加能夠回憶起她記憶中的內在方向。在傳統意義上，*Inga*可以被認為在諮詢她的記憶之前已經對博物館的位置有了一個信念。以同樣的方式，可以說奧託在諮詢他的筆記本之前就已經相信博物館的位置。爭論的焦點是，這兩種情況中存在的唯一區別是*Inga*的記憶是由大腦內部處理的，而*Otto*的思想已經擴展到包括筆記本作為記憶的來源。這款筆記本具有這樣的資格，因為它一直是*Otto*可以立即訪問的*Nd*，並且它會被他自動認可。

進一步說，作者提出並回答了他們關於文化適應的問題：

"那麼社會擴展的認知呢？我的心理狀態可以被其他思想家的狀態部分治愈嗎？我們原則上沒有理由不這樣做。"
他們提出了語言角色的反復出現的主題：

"代理人之間耦合的主要負擔是由語言承擔的......事實上，在最近的進化時代，智力發展的爆發對於這種語言學上的認知擴展和對任何獨立發展的認識都是不可能的。我們內在的認知資源。"

"The Extended Mind" by Andy Clark and David Chalmers (1998)[1] is a seminal work in the field of extended cognition. In this paper, Clark and Chalmers present the idea of active externalism (similar to semantic or "content" externalism), in which objects within the environment function as a part of the mind. They argue that it is arbitrary to say that the mind is contained only within the boundaries of the skull. The separation between the mind, the body, and the environment is seen as an unprincipled distinction. Because external objects play a significant role in aiding cognitive processes, the mind and the environment act as a "coupled system". This coupled system can be seen as a complete cognitive system of its own. The mind is extended into the external world. The main criterion that Clark and Chalmers list for classifying the use of external objects during cognitive tasks as a part of an extended cognitive system is that the external objects must function with th e same purpose as the internal processes.

In "The Extended Mind", a thought experiment is presented to further illustrated the environment's role in connection to the mind. The fictional characters Otto and Inga are both travelling to a museum simultaneous. Otto has Alzheimer's disease, and has written all of his directions Inga is able to recall the internal directions within her memory. In a traditional sense, Inga can be thought to have had a belief as to the location of the museum before consulting her memory. In the same manner, Otto can be said to have held a belief of the location of the museum before consulting his notebook. The argument is that the only difference existing in these two cases is that Inga's memory is being internally processed by the brain, while Otto's mind has been extended to include the notebook as the source of his memory. The notebook qualifies as such because it is constantly a Nd immediately accessible to Otto, and it is automatically endorsed by him.

Going further, the authors ask and answer their own question about the role of enculturation:

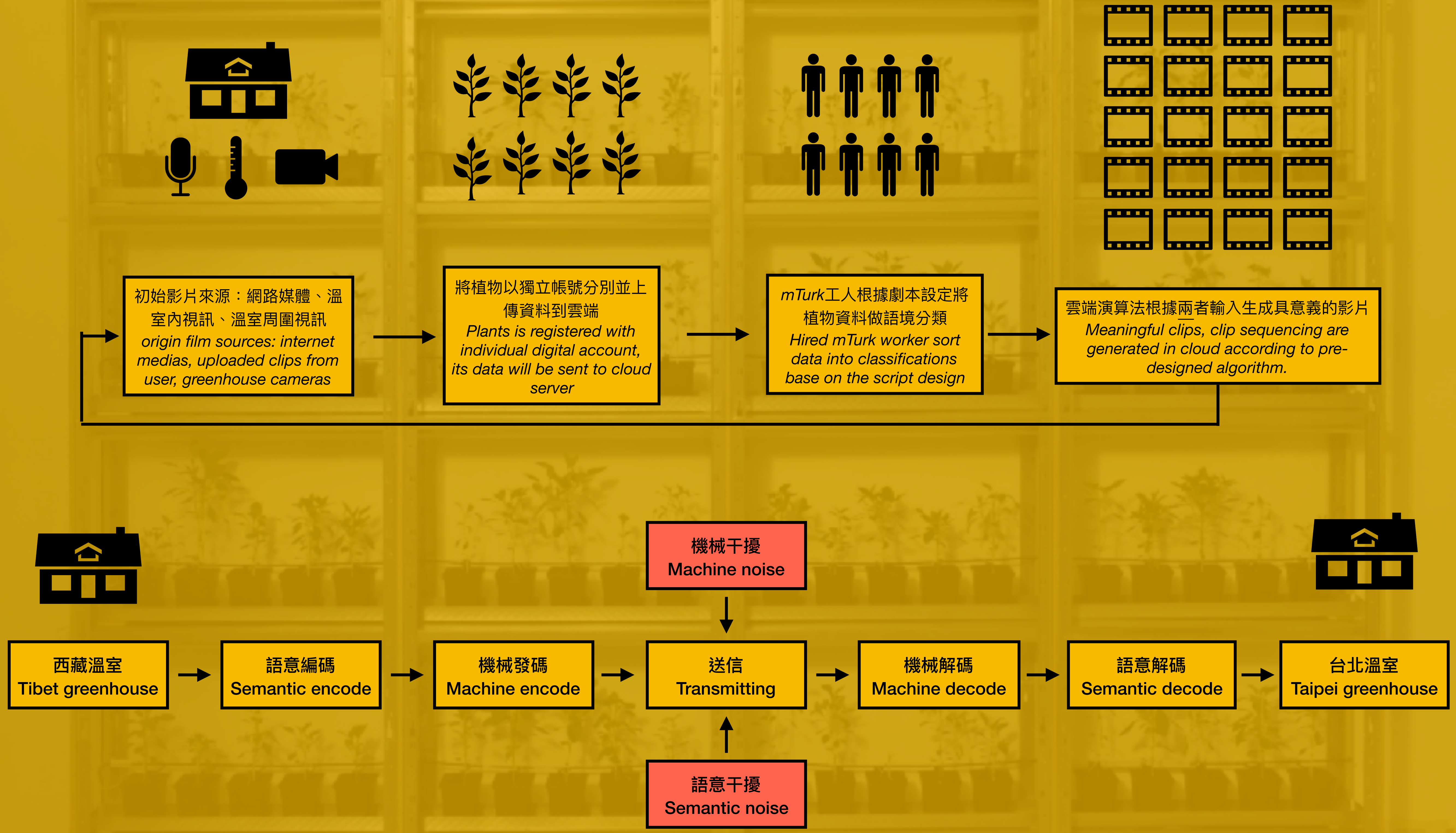
"And what about socially-extended cognition? Could my mental states be partly cured by the states of other thinkers? We see no reason why not, in principle."
They bring up the recurrent theme of the role of language:

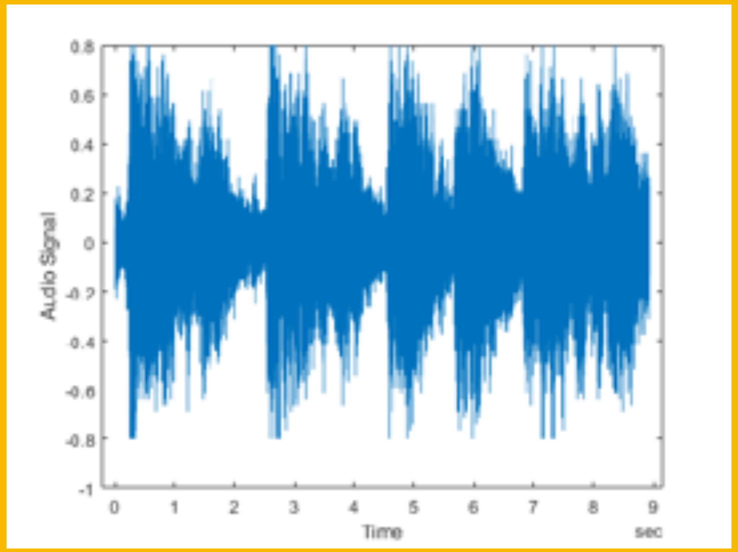
"The major burden of the coupling between agents is carried by language ... Indeed, it is not implausible that the explosion of intellectual development in recent evolutionary time is due as much to this linguistically-enabled extension of cognition as to any independent development in Our inner cognitive resources."

溫室影片對話自動生成邏輯

Diagram of the clips generation

本實驗的主要探索有三，期以此三點出發並完成作品發表前期準備，作品哲學設定、攝影機智能系統設計：一、探索和植物和人的意識合作的主觀性，創造非人意識控制*(cyborg)* 的紀錄片影像語意。二、新媒體藝術在資本世界邊際的功能性和成為進入後資本世界過渡期中所扮演的催化劑角色。三、藝術和慈善的跨域合作性探討。 四、自動化生成影像在網路媒體平臺上的角色探討。





Snow depth [cm]	Precipitation type	Mean temperature	Minimum temperature	Maximum temperature	Average wind speed [main observations] [m/s]	Hours of sunshine
30	Rain	-0.1	-2.8	3	1.7	3.2
30	Not	-2.8	-4.7	1.2	1.6	3.1
30	Not	-5.1	-7.4	-1.8	4.3	4.8
30	Not	-6.6	-7	-4	2.1	0
31	Snow	-12.7	-14.5	-6.1	1.2	0
31	Not	-15.3	-17.3	-12.7	0.8	4.9
31	Not	-8	-15.8	-5.7	5.3	4.8
34	Snow	-1	-10	2.2	2.6	0
34	Rain	0.6	-2.4	3.5	0.3	1
34	Not	-3.1	-8.6	2.1	3.1	5.6
34	Not	-4.5	-6.6	-2.2	2.4	0.5
34	Not	0.9	-3	2.7	2.8	0
34	Snow	-5.1	-9.2	-0.6	0.2	2.9
39	Snow	-3.8	-8.9	-2.8	2.2	0
34	Snow	-3.3	-6.1	-1.2	2.8	0
21	Not	-0.7	-7.6	1.2	6.7	0
21	Not	-5.1	-8.4	-1.9	4.3	3.6
21	Not	-9.9	-11.5	-5.5	3.3	0

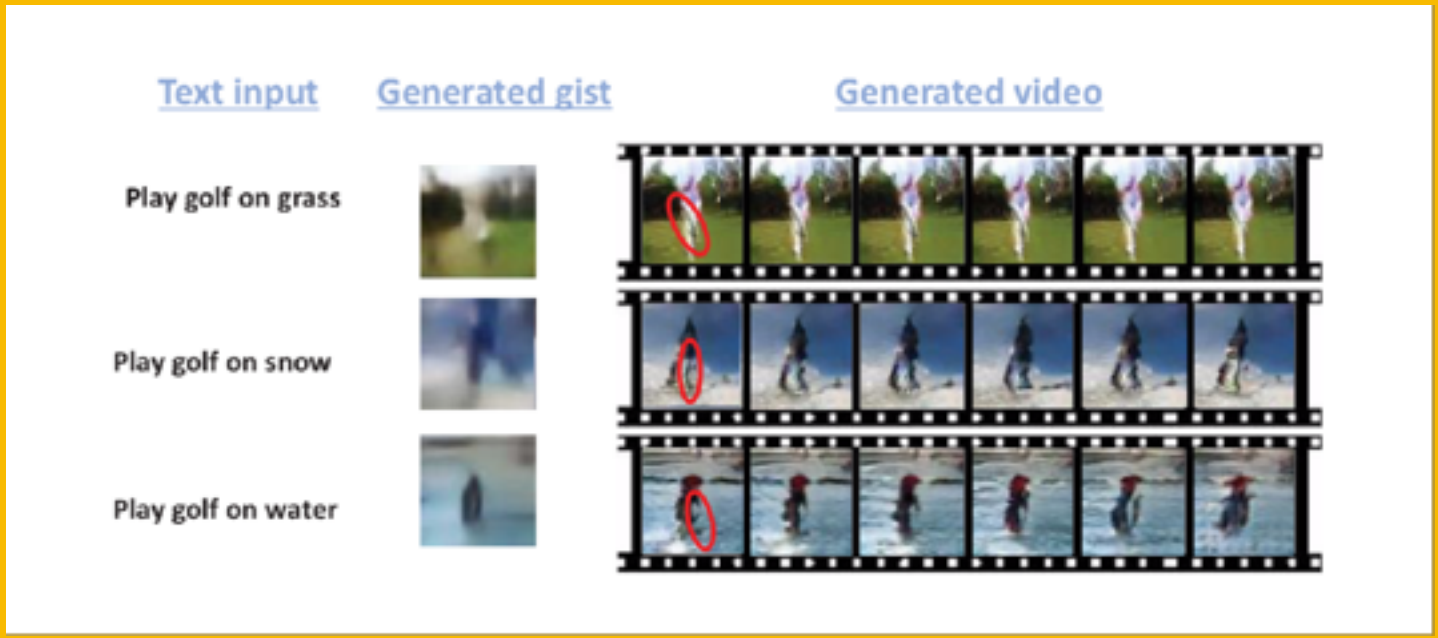
環境音辨識
Environment sound

溫室影像辨識
Greenhouse monitoring

天氣資料、植物資料
Weather, plants data

人工語意分類
Amazon mTurk

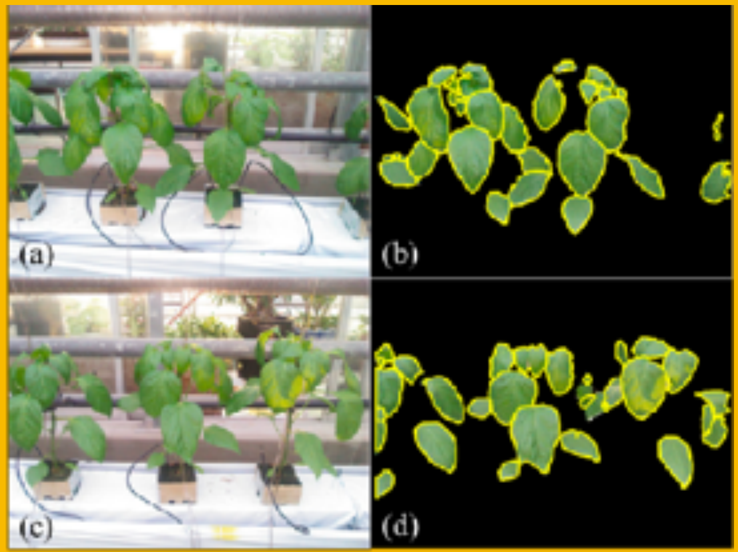
文字、交談
Tests, conversation

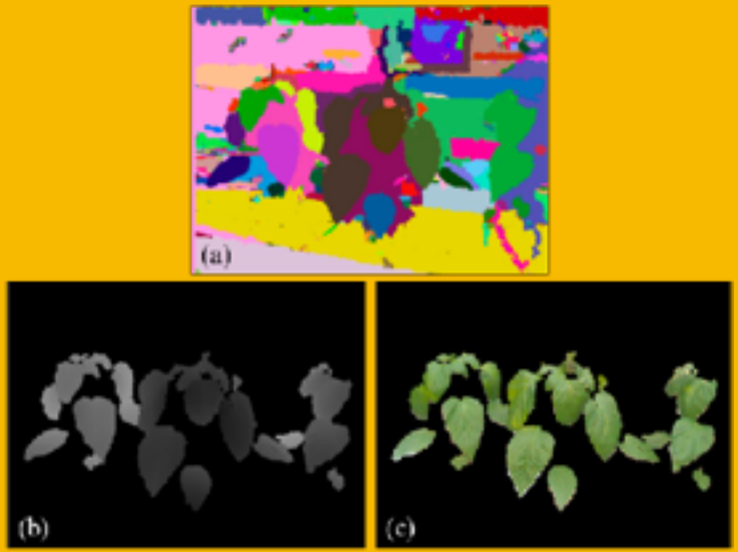


農業自動化工業中的植物葉片3D視覺辨視監測

In Situ 3D Segmentation of Individual Plant Leaves Using a RGB-D Camera for Agricultural Automation

植物的資料將以攝影機影像監測，將嘗試透過影像辨識來取得植物的生長情況，以及其他溫室內發生的事件偵測。在溫室內的植物應分為兩區，一區供食用植物生長供社區需求，另一區供影片生成需要的植物生長資料。這些資料將被上傳到雲端並且依照植物的編號分類成數個帳號。





精準農業（*Precision agriculture*）是一種綜合技術，能夠以最小的能源成本和環境污染提高作物產量。最近，通過引入智能傳感器和機器人等先進技術，精準農業得到了迅速發展。通過使用智能機器，農民手工進行的農作物種植和管理的傳統農業生產率得到顯著提高。基於視覺引導的農業機器人數量被開髮用於自動農業操作，例如微劑量，植物去葉，雜草控制和害蟲管理。由於計算機視覺技術的成功，成像傳感器已成為用於收集植物信息的農業自動化系統中最常用的傳感裝置。植物葉片的圖像分析是農業自動化的基本任務之一，因為植物葉片含有豐富的植物信息。特別是，自動檢測單個葉子是實現農業實踐中精確操作的基本任務。由於植物葉片在自然條件下顯示出顯著變化的姿勢和復雜的形狀，因此單個葉片的分割是具有挑戰性的任務。植物葉片分割在過去幾十年中得到了廣泛的研究。提出了許多傳感技術來獲取植物信息，如圖像相機，紅外相機，光譜相機等。在初始階段，植物葉片分割主要通過使用*2D*分割方法進行。引入遺傳算法從冠層圖像中提取單個葉片。其從番茄田的圖像中有效地提取植物葉子。神經網絡在檢測植被像素和從地面提取葉子方面也表現出高性能。這些作品成功地從自然背景中提取葉子形狀。然而，這些方法不太能夠從遮擋中識別葉子並且可能對照明變化敏感。閉塞經常發生在植物圖像中。為了處理被遮擋的植物葉子的處理，提出了包含葉子形狀的先驗知識的可變形模型，以從復雜的背景中分割出各個葉子。開發了一個參數可變形模板，以根據葉片的尖端積累雜草葉片的信息。近來，活動形狀模型（*ASM*）用於利用先驗知識檢測田間條件中的被遮擋的葉子。提出了一種改進的活動形狀模型來檢測溫室中被遮擋和損壞的辣椒葉。活動形狀模型在識別雜草物種方面表現出高精度。最近，植物葉片的*3D*分割由於快速發展的成像系統和計算機的高度改進的計算性能而引起科學家和工程師的注意。開發各種成像系統以獲得*3D*植物圖像，例如立體相機和激光掃描儀。來自多個視圖（例如，立體視覺）的三維重建是獲得對象的準確*3D*信息的成功技術之一。 *Quan*等人。開發了一個基於圖像的植物建模系統，可以從一組圖像中重建植物的三維模型。

Structure of plant monitoring using Kinect camera in the green house. （節自*DOI: 10.3390/s150820463)*
https://www.researchgate.net/figure/Plant-images-and-segmentation-results-a-c-are-field-images-and-b-d-are-their_fig8_281812279

2019 實施進度表 Greenhouse Timetable

扎西格森溫室建造研討會，青海溫室義工召集 *4/16, 4/23, 4/30*

台北溫室替身建造計劃農業駭客篇 *6/15 ~ 8/15*

生成影像和植物意識
非人類中心溝通設計工作坊
8/3, 8/17, 8/17

溫室熱水系統升級
Hot water system installing

雲端攝影機安裝
IOT camera, sensors installing

國際工作坊
International workshops

影像主意識生成方式確定
Methodology of the generative film confirmed

試映、影片上線
First screening, live streaming initiation

第一次上青海
第二個溫室建構，第一次硬體修正
First site visit
Construction of the second greenhouse
First hardware adjustment

最終影像作品試映
Final film test run

最終影像完成，展覽
Final film crank up, exhibition opening

APR 1 — **MAY 1** — **JUN 1** — **JLY 1** — **AUG 1** — **AUG 20** — **SEP 1** — **OCT 1** — **NOV 30**

網站建立
Website establishing

TAM 2019
TAM 2019 open call

第二個西藏溫室建構
Construction of the second greenhouse

劇本設計、角色設計
Script design

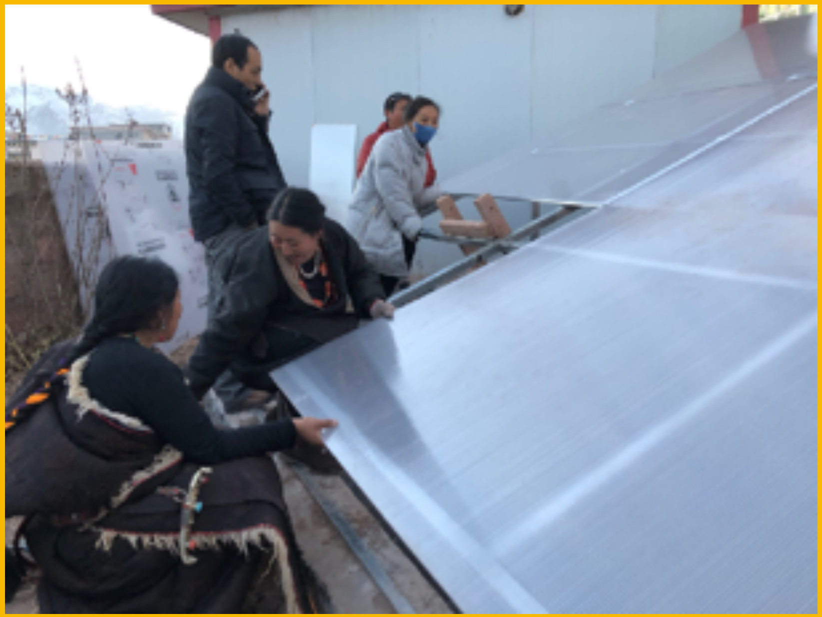
植物參與機制設定
Plant monitoring design

*GAN*演算法設計
Algorithm design for the generative film

*AWS*資料智慧渠道設計
AWS server smart pipeline design

台北溫室建構
Construction of the Taipei greenhouse

第一個原型溫室十一月建造紀錄 / first prototype documents



https://shihweichieh.com/Greenhouse-Nangqen-on-going-research-project

第二個溫室於扎西格森孤貧職業學校由校長達哇堪布監造

The second greenhouse at Tashi Gatsen School was built by the principal Dawa Kunbo མཁན་པོ་ཞེས་རབ་བླ་བ།

Thank you
Greenhouse log
Tribe Against Machine